The New Zealand Aleyrodidae (Hemiptera: Homoptera)[1]

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The pioneer worker on the New Zealand Aleyrodidae was W. M. Maskell, who also described species from all over the world. The Maskell collection of Aleyrodidae is therefore an important one. It has recently been returned to New Zealand after having been on loan to the Bureau of Entomology of the United States Department of Agriculture for many years and is now, together with the equally important Maskell collection of Coccidae, in the collection of the Entomological Research Station of the Department of Scientific and Industrial Research at Nelson.

It is desirable that Maskell's species should be redescribed. This task has been facilitated by the location of Maskell's unmounted duplicate material of some species and the collection of others from the field. In addition to Maskell's species there is one New Zealand species described by Takahashi (1937). Two species are described as new.

Considerable confusion has centered around Maskell's genus *Asterochiton*, though this has been clarified, in so far as it affects the genus *Trialeurodes*, by Russell (1948).

Maskell (1879) described the first Aleyrodids from New Zealand. These were *lecanioides* (which has page precedence) and *aureus*, for which two species he created a new genus *Asterochiton*, placing it in error as a Coccid genus. No genotype was designated and it is doubtful if his definition of the genus, "characterised by enclosure in a test," is an adequate generic prescription. The figure and description of *aureus* is quite recognisable, while that of *lecanioides* suggests *Trialeurodes vaporariorum* Westw. Maskell (1880) recognised his error and removed his two species of *Asterochiton* from the Coccidae to the Aleyrodidae. In 1890 (pp. 175–176) he repeats the correction and, apparently considering that the genus *Asterochiton* was invalidated or unnecessary, discontinued its use in favour of *Aleurodes*. The species *lecanioides* he stated to have been based on material containing two species, which he now described as *Aleyrodes papillifer* and *A. simplex*. The name *lecanioides* should have remained valid in reference to the *vaporariorum*-like species which he first described. Apparently considering that the invalidation of the genus *Asterochiton* also invalidated the species *aureus* he discarded this name and redescribed and named the same species as *Aleurodes melicyti*. In the same year he described *Aleurodes asplenii* and *A. fagi*. In 1896 he described *A. cerata* and *A. fodiens*.

Cockerell (1902) listed Maskell's species and stated that *papillifer* was a synonym of *lecanioides* and *melicyti* was a synonym of *aureus*. He revived Maskell's name *Asterochiton* as a subgenus of *Aleyrodes*, defined the subgenus, and cited *aureus* as the genotype. He also stated that *lecanioides* did not belong to the subgenus *Asterochiton* as defined by him. He defined the subgenus *Trialeurodes* and nominated *pergandei* Quaintance as the genotype.

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Kirkaldy (1907) gave *Asterochiton* Maskell as a subgenus of *Aleyrodes* and cited *lecanioides* as genotype, stating that Cockerell was wrong in citing *aureus* as genotype.

Quaintance (1908) gave *Asterochiton* Cockerell as a subgenus of *Aleyrodes*, with *aureus* Maskell as genotype, and listed *melicyti* Maskell as a synonym of *aureus* and *papillifer* Maskell as a synonym of *lecanioides* Maskell.

Quaintance and Baker, who published three papers on the classification of the Aleyrodidae, had Maskell's type material available for study. In the 1914 paper (p. 109) *vaporariorum* Westw., of which *lecanioides* Mask. and *papillifer* Mask. are listed as synonyms, is given as the genotype of *Asterochiton* Maskell because these authors wrongly believed Maskell to have designated *lecanioides* as the genotype of *Asterochiton* and, on examination of the type of *papillifer*, found it to be a synonym of *vaporariorum* Westw. Quaintance and Baker (1914: 98), overlooking the fact that Cockerell had designated *aureus* as the genotype of *Asterochiton*, erected a new genus *Dialeurodoides* with *aureus*, which they figured, as genotype, and included in it *fagi* Mask. and *simplex* Mask. In a correction (1915: xi) it was stated that *Asterochiton* of the 1914 paper must replace *Dialeurodoides* Q. and B., and that *Trialeurodes* Cockerell must replace *Asterochiton*. Cockerell's designation of genotypes has priority over those of Kirkaldy (1907) and Quaintance and Baker (1914) and the species congeneric with *aureus* belong to *Asterochiton* Maskell and those congeneric with *pergandei* belong to *Trialeurodes* Cockerell. Quaintance and Baker in the 1914 paper, as amended by the 1915 correction, placed *fodiens* Mask. in *Dialeurodes* and *asplenii* Mask. in *Trialeurodes*. Quaintance and Baker (1917) redescribed and figured *Dialeurodes fodiens* Mask.

Takahashi (1937) described and figured *Aleyrodes winterae*.

The New Zealand Aleyrodid fauna, as it is known at present, is a limited and fairly homogenous one in which only the subfamily Aleyrodinae is represented. The subfamily Udamoselinae is represented in Australia, and Maskell described a species of *Aleurodicus* from Fiji, though it is possibly introduced. The New Zealand fauna shows no obvious affinities with the much larger and more generically diversified fauna of Australia, with that of New Caledonia, or with the limited faunas described from Chile and the insular Pacific region.

Subfamily *ALEYRODINAE* Enderlein

GENERIC KEY TO PUPAL CASES OF NEW ZEALAND SPECIES

1. Numerous papillae in single row on submargin, lingula knobbed and lobed..... .....**Trialeurodes** Cockerell

   Not as above.....2

2. Thoracic and abdominal pore areas invaginated, tracheal comb teeth present..... .....**Asterochiton** Maskell

   Not as above.....3

3. With marginal or submarginal setae, caudal furrow absent....**Aleyrodes** Latreille

   Not as above.....**Aleuroclava** Singh

KEY TO ADULTS OF NEW ZEALAND SPECIES OF *Aleyrodidae*

1. Antenna with segment 7 twice as long as 6; hind tibiae with comb of 30–34 setae; forewing 1.8 mm. long, R_1 present; lingula widest at apex, truncate, with 4 conical processes.**Asterochiton aureus** Maskell

   Antennal segment 7 not twice as long as 6; hind tibia with not more than 22 setae in comb; wing not longer than 1.5 mm. without R_1 or with stub only; lingula if truncate without apical processes and widest before apex.....2

2. Penis in lateral view subparallel sided..3

   Penis tapering.....6

3. Penis narrow, strongly sinuate, apex truncate; wing with stub of R_1 present; lingula truncate, excised at corners of apex..... .....**Aleuroclava eucalypti** n. sp.
   Penis wide, not sinuate, apex toothed; lingula rounded apically.....4
4. Apical tooth of penis longer, more pointed; antennal segment 5 nearly twice as long as 6.....**Aleyrodes fodiens** Maskell
   Apical tooth of penis shorter, more rounded; antennal segment 5 slightly longer than 6.....5
5. Apex of penis narrowed abruptly at nearly right angles, to base of apical tooth..... .....**Asterochiton pittospori** n. sp.
   Apex of penis narrowed obliquely at 45 degrees, to base of tooth..... .....**Asterochiton simplex** (Maskell)
6. Penis more strongly hooked or falcate apically; antennal segment 3 longer than 4–6 combined; wing length 1.5 mm.; lingula truncate apically..... .....**Trialeurodes asplenii** (Maskell)
   Penis apex less strongly hooked; antennal segment 3 shorter than 4–6 combined; wing length 1.0 mm.; lingula truncate-excavate apically..... .**Trialeurodes vaporariorum** (Westw.)

Genus TRIALEURODES Cockerell

KEY TO PUPAL CASES OF NEW ZEALAND SPECIES OF *Trialeurodes*

With up to 7 larger, circular papillae on the submargin in addition to the more numerous smaller conical papillae; unpigmented in median areas.....**vaporariorum** (Westw.)
Submarginal papillae uniform in size; pigmented on cephalic and abdominal median areas.....**asplenii** (Maskell)

Trialeurodes asplenii (Maskell)
Figs. 1, 2

Aleurodes asplenii Maskell 1890: 173–4, pl. 13, figs. 18–20.

Aleyrodes asplenii Maskell. Cockerell, 1902: 281; Kirkaldy, 1907: 46; Quaintance, 1908: 5.

Asterochiton asplenii (Mask.) Quaintance and Baker, 1914: 105, and footnote p. 104.

Trialeurodes asplenii (Mask.) Quaintance and Baker, 1915: xi.

LARVA: Described by Maskell (1890: 174, fig. 18). Specimen not located.

PUPAL CASE: (Fig. 1). Length 1.0 mm., width 0.7 mm. Derm pale but with light brown pigmentation in the median cephalic area and in the median and subdorsal area of abdominal segments 2–6 inclusive. Elliptical, widest behind mid-length, raised on vertical white wax palisade. Margin crenulated, about 20 crenulations in 0.1 mm. Thoracic tracheal fold present. Tracheal pore (Fig. 2*a*) semicircular, with 4–5 marginal crenulations opposite the pore narrower than the others. Abdominal tracheal fold and pore absent, crenulations not noticeably narrower. Submarginal area with a single row of about 55 fairly sharply conical papillae of uniform size on each side. Abdominal segment 7 not as narrow as in *vaporariorum*. Subdorsal papillae absent. One pair of para-median cephalic setae, one pair on each of first and 8th abdominal segments and one pair of caudal setae (Fig. 2*b*). Posterior marginal setae present. Vasiform orifice (Fig. 2*c*) subcordate, notched posteriorly, length 0.085 mm., width 0.06 mm. Operculum occupying about half the orifice, length 0.04 mm., width 0.05 mm. Lingula clubbed, with three paired lateral lobes and one unpaired median caudal lobe and two apical setae. Caudal furrow absent.

ADULT: (Fig. 2*d*, *e*). *Female*, antennae with segment 3 longer than segments 4–6 combined, segments 4 and 6 subequal and shorter than 5 and 7, 5 longer than 7, flagellum of 7 much shorter than base. Wings white, immaculate, forewing length 1.5 mm. Hind tibia with about 16 setae in comb. *Male*, operculum (Fig. 2*d*) transverse, 0.02 mm. long, 0.04 mm. wide, posterior margin concave. Lingula

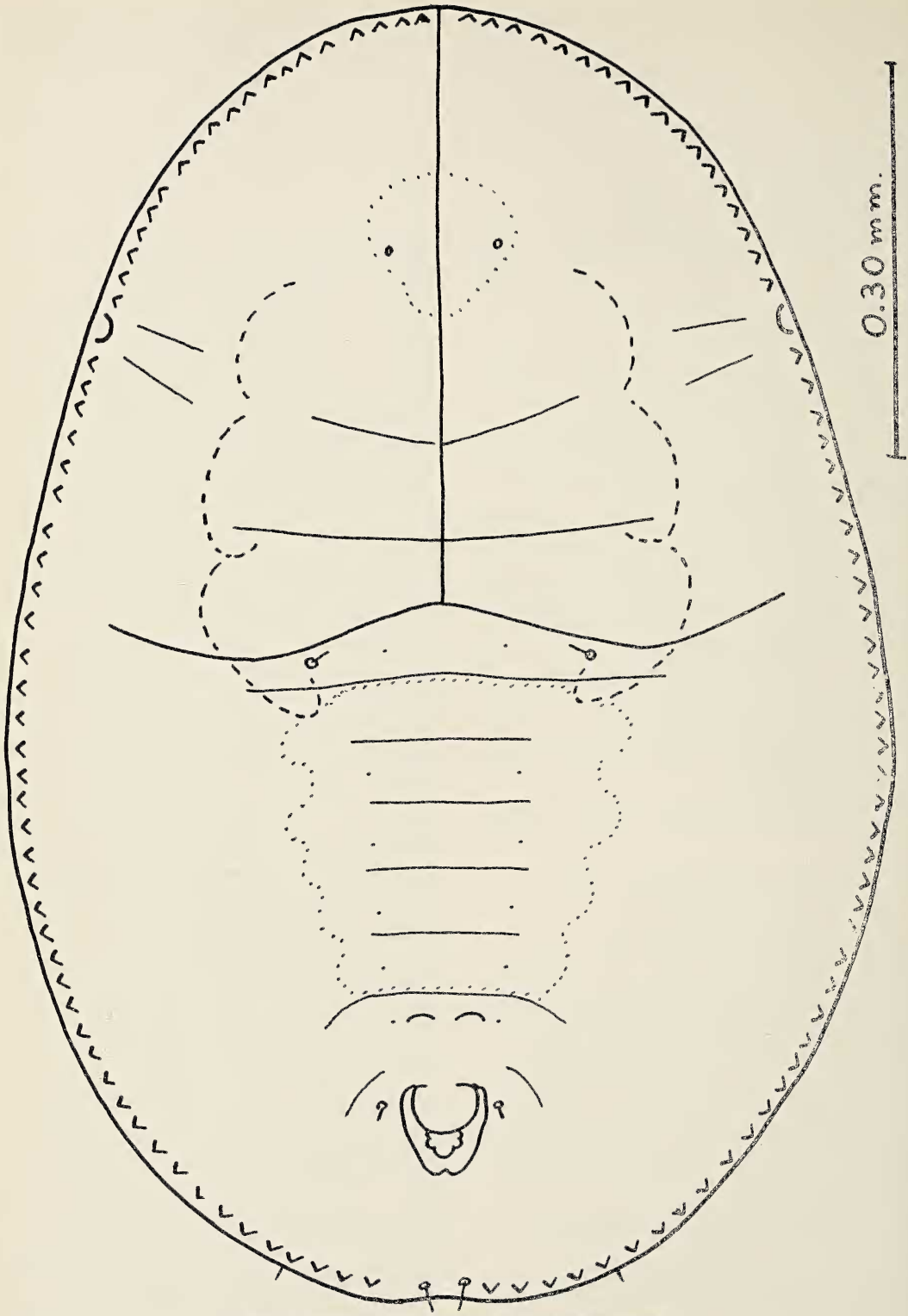


FIG. 1. *Trialeurodes asplenii* Mask. Pupal case, dorsal.

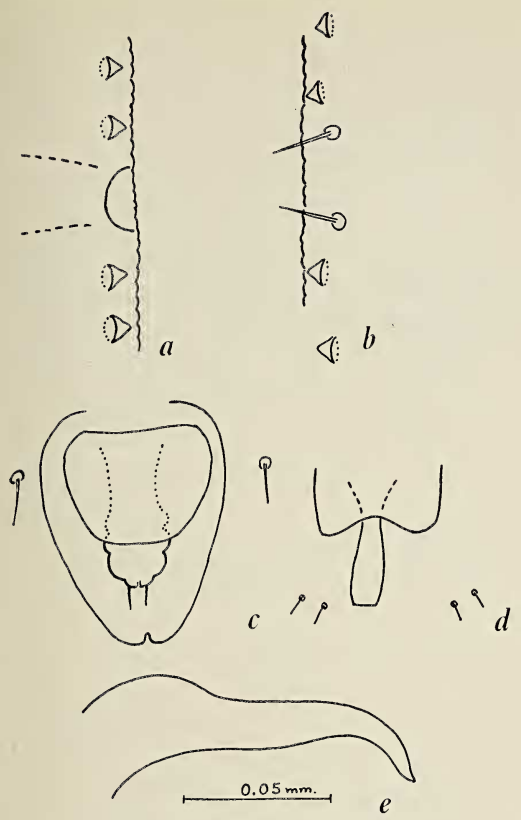


FIG. 2. *Trialeurodes asplenii* Mask. Pupal case: *a*, Thoracic tracheal fold and pore; *b*, caudal margin; *c*, vasiform orifice. Adult male: *d*, Operculum and lingula; *e*, penis, lateral view.

about 0.04 mm. long, 0.01 mm. wide, constricted near base, truncate apically. Penis (Fig. 2*e*) tapered to apex which is pointed not truncate and curved dorsally. Slightly sinuate above and below, length 0.11 mm.

LECTOTYPE: Pupal case on slide mount. Maskell collection.

TYPE LOCALITY: New Zealand.

FOOD PLANT: Fern, *Asplenium lucidum* and other ferns.

COTYPE: Pupal case on slide mount, U. S. Bureau of Entomology.

OTHER MATERIAL: Slide mounts of genitalia and wings and unmounted duplicate material in Maskell collection. Unmounted duplicate material (3 pupae and one larva) in U. S. Bureau of Entomology. Pupal cases and adults from *Asplenium lucidum*, Ruby Bay, Nelson, Jan. 1952, in the author's collection.

There are no undoubtedly endemic species of *Trialeurodes* known in Australia or New Zealand and since *asplenii* occurs on *Asplenium* and other ferns it could well have been introduced on ornamental ferns and not be native to New Zealand.

Trialeurodes vaporariorum (Westwood)
Figs. 3–5

Aleyrodes vaporariorum Westw. 1856. Gardeners Chronicle, p. 852.

Asterochiton lecanioides Maskell, 1879: 215–216 (in part), 1880: 300–301 (in part); Quaintance and Baker, 1914: 105.

Aleyrodes lecanioides (Mask.). Cockerell, 1902: 281; Kirkaldy, 1907: 60.

Aleurodes papillifer Maskell, 1890: 173, 1896: 438.

Asterochiton papillifer (Mask.). Quaintance and Baker, 1914: 105.

Trialeurodes lecanioides (Mask.). Quaintance and Baker, 1915: 11; Russell, 1948: 7–8, 43–45.

Trialeurodes papillifer (Mask.). Quaintance and Baker, 1915: 11; Russell, 1948: 7–8, 43–45.

PUPAL CASE: (Fig. 3). Length 0.75–0.10 mm., width 0.5–0.75 mm. Derm thin and colourless except for the papillae. Shape elliptical. Case raised off leaf on vertical palisade of white wax. Margin (Fig. 4*a*) crenulated, about 12 crenulations in 0.1 mm. Thoracic tracheal pore area (Fig. 4*b*) marked by narrowing and depth of 3–10 crenulations. Commonly 75–110 submarginal papillae in a single row; 1–9 pairs may be larger than the others but these may be absent. Usually four pairs of subdorsal papillae but these may be absent. When present one pair is cephalic, one pair mesothoracic and one pair on each of the third and fourth abdominal segments. Setae; one pair cephalic, one pair first abdominal, one pair 8th abdominal often very long, and one pair caudal usually long. Vasi-

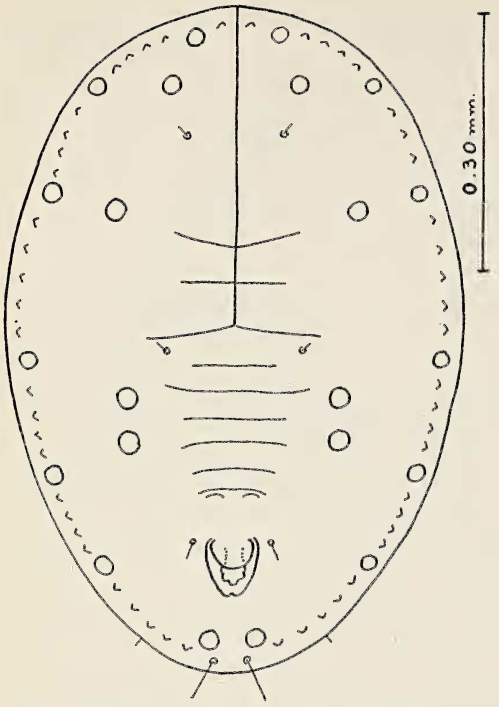


FIG. 3. *Trialeurodes vaporariorum* Westw. Pupal case, dorsal.

form orifice (Fig. 4*c*) 0.056–0.076 mm. long, 0.056–0.070 mm. wide, cordate, notched at posterior tip and with prominent tooth in notch. Operculum 0.036–0.048 mm. long and 0.044–0.060 mm. wide, cordate. Lingula 0.040–0.060 mm. long, 0.024–0.032 mm. wide, with two long setae and three pairs of lateral lobes and one median unpaired lobe. Caudal furrow present narrow.

ADULT: *Female*, antennae (Fig. 5*a*) with segment 3 shorter than segments 4–6 combined, 5 nearly twice as long as 6, flagellum of 7 short. Wings white unspotted, forewing 1.0 mm. long, R_1 absent. Hind tibiae with 13–16 setae in comb. *Male*, operculum (Fig. 5*b*) 0.02 mm. long, 0.045 mm. wide. Lingula truncate and excavate apically, length 0.03 mm., width 0.01 mm. Penis (Fig. 5*c*) length 0.1 mm., tapering and slightly falcate at apex in lateral view.

FOOD PLANTS: Recorded by Maskell from *Pittosporum eugenioides* and *Geniostoma* sp. Common on tomato and other plants.

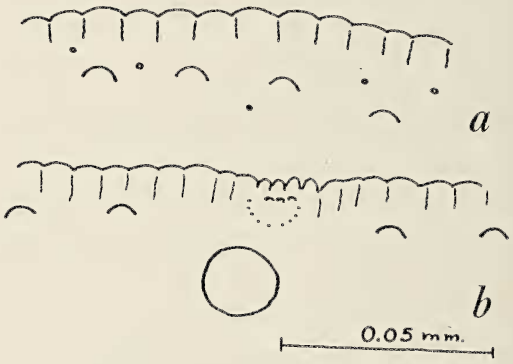
MATERIAL: A slide of *papillifer* (dated 1889, W. M. M.) stained and remounted by the U. S. Bureau of Entomology in the Maskell collection.

A cosmopolitan species.

Genus ASTEROCHITON Maskell

The generic prescription of Quaintance and Baker (1914: 98) and Sampson (1943: 208) must be amended as follows:

Medium in size, subelliptical to sub-



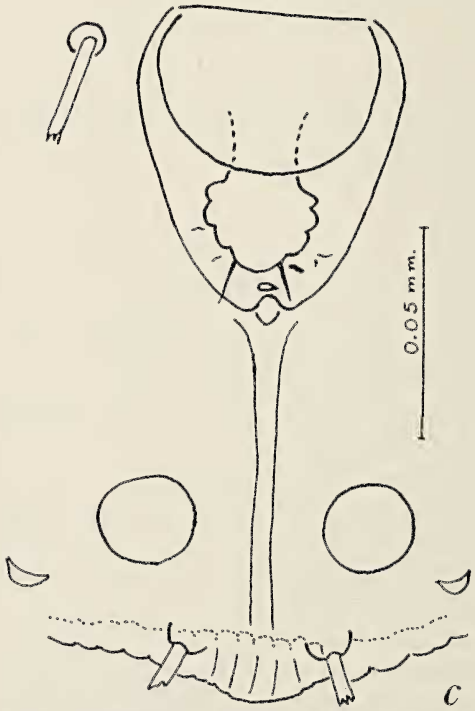


FIG. 4. *Trialeurodes vaporariorum* Westw. Pupal case: *a*, Margin; *b*, thoracic tracheal pore; *c*, vasiform orifice and caudal margin.

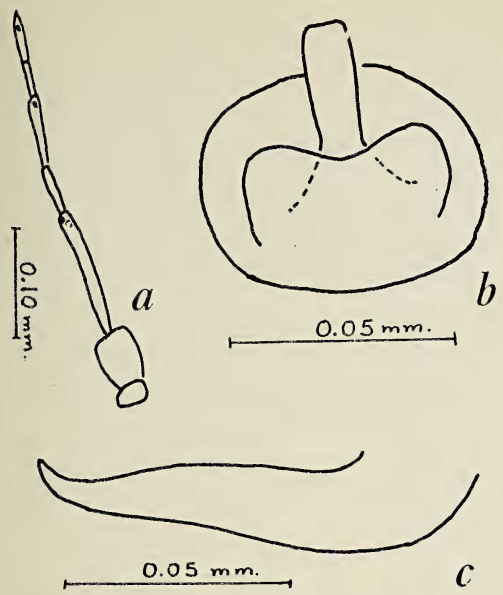


FIG. 5. *Trialeurodes vaporariorum* Westw. Adult female: *a*, Antenna. Adult male: *b*, Vasiform orifice; *c*, penis.

circular in shape. Margin with one row of teeth. Submargin may be separated from dorsal disc. Thoracic tracheal folds and combs present. Caudal fold may be indicated, comb present. Vasiform orifice subcordate, may be pointed posteriorly. Operculum transversely semicircular, subcordate or subtrapezoidal, filling about half the orifice. Lingula expanded at tip, bluntly pointed or rounded, exposed, included.

KEY TO PUPAL CASES OF NEW ZEALAND SPECIES OF *Asterochiton*

1. With four prominent radial pore bands on disc; pores present on submargin..... .....**aureus** Maskell

   Not as above.....2

2. With 13 prominent submarginal setae on each side.....**fagi** (Maskell)

   Not as above.....3

3. Without discal setae; submargin defined .....**cerata** (Maskell)

   Not as above.....4

4. Abdomen with 4 pairs of setae laterad on disc on segments 5–8.**simplex** (Maskell)

   Abdomen with only one pair of setae laterad on disc, on segment 4..... .....**pittospori** n. sp.

Asterochiton aureus Maskell
Figs. 6–8

Asterochiton aureus Maskell. 1879: 216, pl. 7, fig. 17d; 1881: 301.

Aleurodes melicyti Maskell. 1890: 174, pl. 13, figs. 21–24.

Aleyrodes (*Asterochiton*) *aurea* (Mask.) Cockerell, 1902: 282.

Aleyrodes (*Asterochiton*) *aureus* (Mask.) Kirkaldy, 1907: 47; Quaintance, 1908: 5.

Dialeurodoides aureus (Mask.) Quaintance and Baker, 1914, pp. 98–99, pl. 37, figs. 7–11.

Asterochiton aureus (Mask.) Quaintance and Baker, 1915, p. xi; Sampson, 1943: 208; Russell, 1948: 7–8.

PUPAL CASE: (Fig. 6). Length 1.1 mm., width 1.0 mm. Colour golden yellow, pale brown in median area. Shape subcircular. Margin (Fig. 7*a*) irregularly toothed, about 10 teeth in 0.10 mm. The teeth do not appear to constitute the actual margin which is clear and straight. Thoracic tracheal fold (Fig. 7*b*) distinct, pore abruptly invaginated and with comb of 3–6 teeth. Abdominal tracheal pore (Fig. 7*c*) similar. Setae: posterior marginal, caudal and 8th abdominal setae present. Submarginal area 0.045 mm. wide with numerous large pores and separated by a line mesad of the pores from the dorsal disc. Similar pores are present on the anterior cephalic area of the disc before the cephalic ridge and a few on either side of the caudal furrow. On the disc are four radiating rows of similar pores, two immediately above the thoracic tracheal folds and two on the abdomen just caudad of the transverse moulting suture. The location of the smaller simple pores is shown in the figure. On the cephalic region are two paramedian transverse ridges on each of which are three or four simple pores. Above the

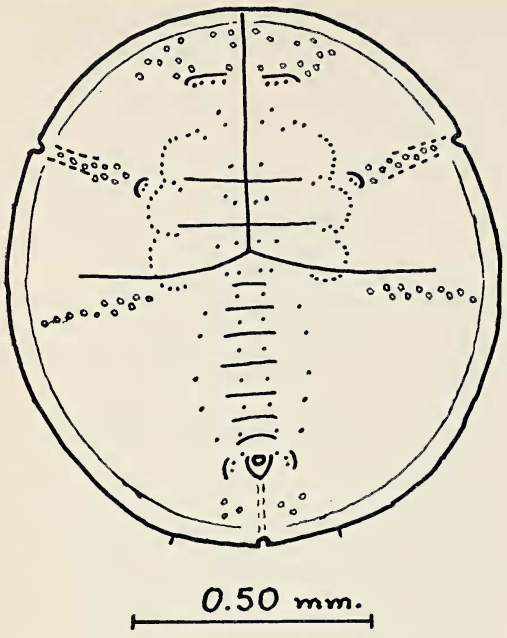
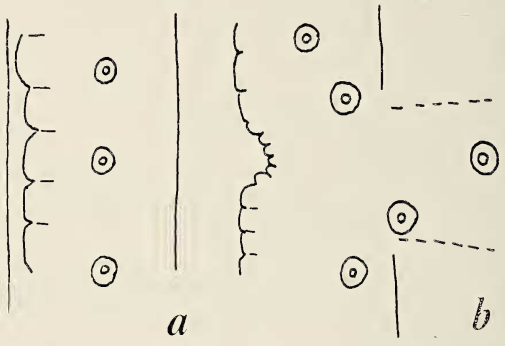


FIG. 6. *Asterochiton aureus* Mask. Pupal case, dorsal.

inner ends of the thoracic folds is a tubercle bearing 2 or 3 simple pores. The vasiform orifice (Fig. 7*c*) is subtriangular 0.06 mm. long and 0.057 mm. wide and acute posteriorly. Operculum is semicircular with a concave anterior margin, 0.04 mm. wide and 0.027 mm. long. The lingula is long; exposed apically and pointed but not acutely so. The floor of the orifice is reticulate. Neither the lingula nor the posterior apex of the orifice is as pointed as is figured by Quaintance and Baker (1914). Caudal furrow present, narrow.

Parasitised pupae are convex, with a narrow glassy white wax ring which is sloping and not vertical. There are white marks in this rim opposite the tracheal pores. The pupa is dark brown to black in the central disc with golden brown margins. There are strong radial ridges coinciding with the four radial pore bands and fainter ridges from each side of the cephalic ridge to the margin and from each side of the orifice to the margin.

ADULT: *Female*, antennae: segment 3, 0.23 mm.; 4, 0.06; 5, 0.07; 6, 0.05; 7, 0.11 mm. long; base of 7 is about ¾ the total length. Wings white immaculate, forewing (Fig. 8*a*) 1.8 mm. long, R_1 present. Hind tibiae (Fig. 8*b*) with 30–34 setae in comb. Operculum (Fig. 8*c*) excised posteriorly with two setae on posterior margin, width 0.04 mm., length 0.025 mm. Lingula widening to apex, truncate, lobed at each posterior lateral angle and with two conical processes between these with apical setae. Lingula length 0.035 mm., width 0.01 mm.



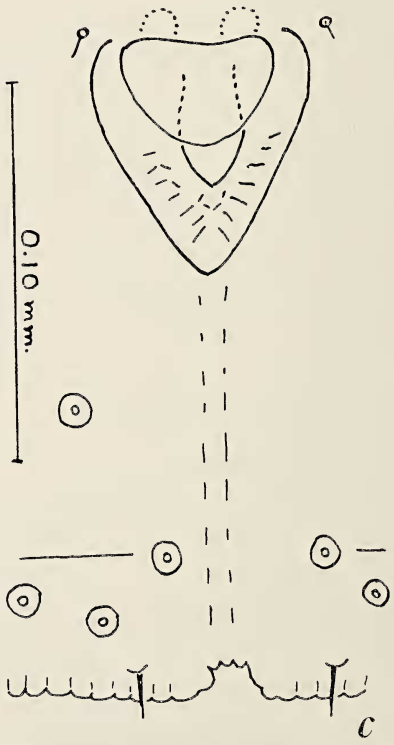


FIG. 7. *Asterochiton aureus* Mask. Pupal case: *a*, Margin; *b*, thoracic tracheal fold and pore; *c*, vasiform orifice and abdominal tracheal pore.

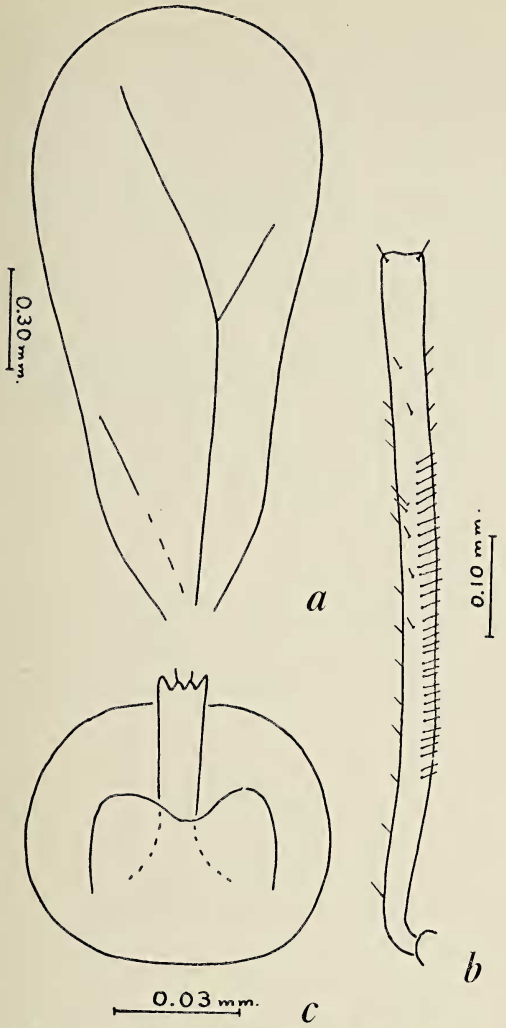


FIG. 8. *Asterochiton aureus* Mask. Adult female: *a*, Forewing; *b*, hind tibia; *c*, vasiform orifice.

LECTOTYPE: Pupal case on slide mount in Maskell collection (labelled *melicyti*).

FOOD PLANT: *Melicytus ramiflorus* (W.M.M.).

TYPE LOCALITY: Auckland.

MATERIAL: One pupal case on cardboard (Maskell material of *melicyti*) in U. S. Bureau of Entomology. Five pupal cases on one slide mount (labelled *melicyti* by Maskell, 1878) in the Canterbury Museum.

Adult females and pupal cases were collected from *Melicytus ramiflorus* at Ruby Bay, Nelson, in January 1952. The pupal cases were sparse and few on a leaf and were dead and mostly parasitised.

Asterochiton cerata (Maskell)

Figs. 9, 10

Aleurodes cerata Maskell 1896: 425–6, pl. 26, fig. 1.

Aleyrodes cerata Mask. Cockerell, 1902: 281; Kirkaldy, 1907: 49; Quaintance, 1908: 5; Quaintance and Baker, 1914: 100.

LARVA: Described by Maskell (1896: 425). Specimen missing.

PUPAL CASE: (Fig. 9). Length 1.1 mm., width 0.7 mm. Shape elliptical flat. Dorsum covered with white flocculent wax, and a narrow ring of clear wax remains on leaf when case is removed. Colour yellowish-brown. Margin irregularly toothed. Thoracic tracheal folds not evident, thoracic tracheal pore (Fig. 10*a*) invaginated with comb of 2 or 3 teeth at bottom. Abdominal tracheal folds not evident, pore (Fig. 10*b*) and comb similar to thoracic. Setae: 8th abdominal, caudal and posterior marginal setae present. Submargin 0.03 mm. wide, delimited by line immediately mesad of which is a row of about 12 minute setae on each half and mesad of these a row of 60–65 minute circular pores. Sutures and segmentation faint. Pairs of faint paramedian pores on abdominal segments 1–7. Vasiform

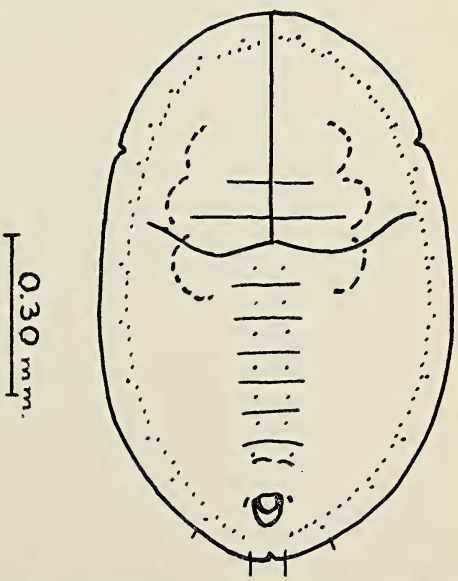


FIG. 9. *Asterochiton cerata* Mask. Pupal case, dorsal.

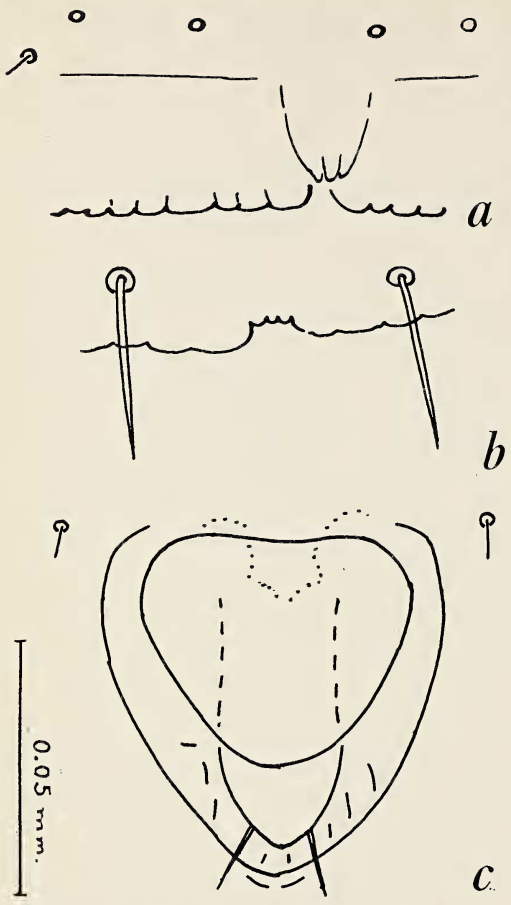


FIG. 10. *Asterochiton cerata* Mask. Pupal case: *a*, Thoracic tracheal pore; *b*, abdominal tracheal pore; *c*, vasiform orifice.

orifice (Fig. 10*c*) subcordate, 0.07 mm. long, 0.065 mm. wide, floor reticulate. Operculum subtriangular, 0.04 mm. long, 0.05 mm. wide more than half filling orifice. Lingula little constricted basally, bluntly pointed, with two strong apical setae.

ADULT: Unknown.

LECTOTYPE: Slide mount of pupal case (labelled larva) in Maskell collection.

FOOD PLANT: *Nothofagus menziesii.*

TYPE LOCALITY: Reefton. Collect. R. Raithby.

MATERIAL: One pupal case on Maskell slide mount (cotype) in U. S. Bureau of Entomology.

Duplicate unmounted material in Maskell collection. This species, which is not a typical *Aleurodes* but has the facies of *Asterochiton*, has been transferred by me to that genus.

Asterochiton fagi (Maskell)
Figs. 11, 12

Aleurodes fagi Maskell, 1890: 175, pl. 13, figs. 25, 26; 1896: 432.

Aleyrodes fagi Mask. Cockerell, 1902: 281; Kirkaldy, 1907: 53; Quaintance, 1908: 6.

Dialeurodoides fagi (Mask.) Quaintance and Baker, 1914: 99.

Asterochiton fagi (Mask.) Quaintance and Baker, 1915: xi.

LARVA: Unknown.

PUPAL CASE: (Fig. 11). Length 1.2 mm. Width 0.90 mm. Colour light yellowish-brown. Shape elliptical. Raised on vertical palisade of wax. Margin (Fig. 12*a*) irregularly

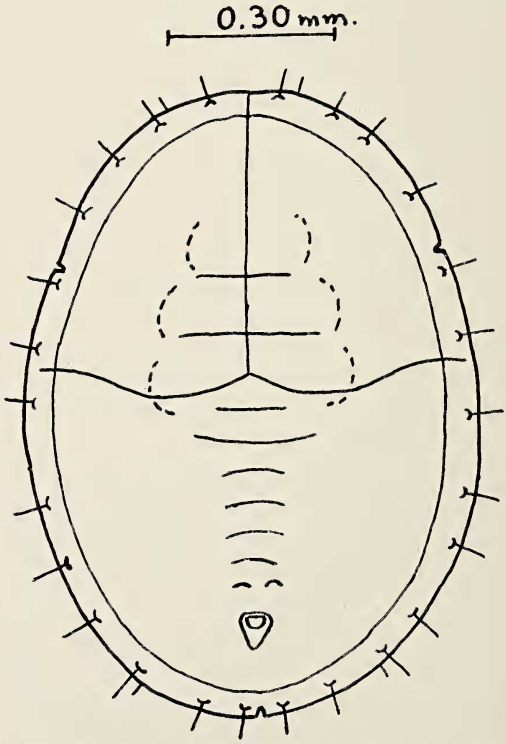


FIG. 11. *Asterochiton fagi* Mask. Pupal case, dorsal.

crenulate. Tracheal folds not evident. Thoracic tracheal pore (Fig. 12*b*) invaginated with two or three small teeth at bottom. Abdominal tracheal pore (Fig. 12*c*) similar. Anterior and posterior marginal setae present. Thirteen submarginal setae 0.10 mm. long on each side, based just mesad of margin, six on cephalothorax and 7 on abdomen. Minute setae on 8th abdominal segment. Caudal setae not differentiated from marginal setae. Disc without setae or prominent pores. Submargin separated from disc by line 0.07 mm. from margin. Vasiform orifice (Fig. 12*d*) 0.08 mm. long, 0.06 mm. wide, subtriangular, rather acute posteriorly. Operculum 0.05 mm. wide, 0.04 mm. long, sub-semicircular. Lingula slightly constricted basally, bluntly pointed apically, with two apical setae.

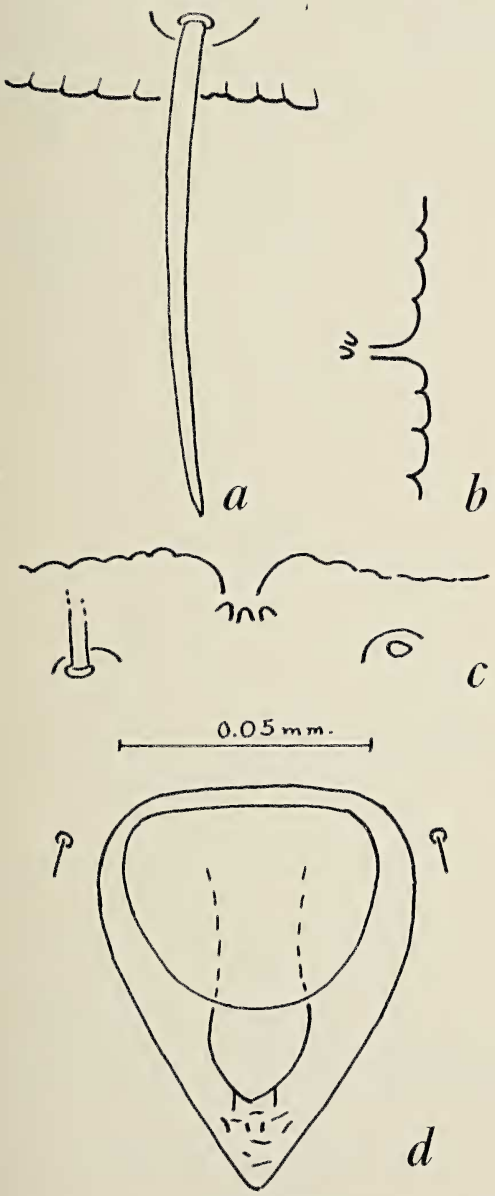


FIG. 12. *Asterochiton fagi* Mask. Pupal case: *a*, Margin; *b*, thoracic tracheal pore; *c*, abdominal tracheal pore; *d*, vasiform orifice.

ADULT: Unknown.

LECTOTYPE: Slide mount of pupal case in Maskell collection.

FOOD PLANT: *Nothofagus menziesii.*

TYPE LOCALITY: Inangahua. collect. R. Raithby.

MATERIAL: One pupal case on leaf (Maskell material) in U. S. Bureau of Entomology. Two pupal cases on leaf in Maskell collection. Unmounted Maskell duplicate material in Maskell collection. All or nearly all the material has been parasitised.

Asterochiton pittospori n. sp.
Figs. 13–15

LARVA: Unknown.

PUPAL CASE: (Fig. 13). Length 1.3 mm., width 1.0 mm. Colour white. Shape elliptical, flat. With a narrow fringe of white wax. Margin (Fig. 14*a*) is obscurely and rather irregularly toothed or crenulate. Thoracic tracheal fold (Fig. 14*b*) present, pore invaginated with a few or a group of teeth at bottom. Caudal fold absent, pore and comb (Fig. 14*c*) similar to thoracic. Anterior and posterior marginal setae present. Eight cephalothoracic discal setae as in *simplex*, one pair on first abdominal segment, one pair on fourth abdominal segment, one pair of minute setae on 8th abdominal segment and one pair of caudal setae of same size as other discal setae. Vasiform orifice (Fig. 14*d*) subtriangular, 0.7 mm. long, 0.6 mm. wide, floor reticulate. Operculum semicircular 0.05 mm. wide, 0.035 mm. long, half filling orifice. Lingula 0.04 mm.

long, finger-like, rounded apically, slightly constricted basally.

ADULT: *Female*, antenna (Fig. 15*a*) segment 3, 0.17 mm. long; 4, 0.04 mm.; 5, 0.05 mm.; 6, 0.04 mm.; 7, 0.05 mm., flagellum of 7 very short about ¼ as long as base. Wings (Fig. 15*b*) white, immaculate, forewing length 1.4 mm., R_1 absent. Hind tibiae with 22 setae in comb. *Male*, vasiform orifice (Fig. 15*c*) subcircular. Operculum 0.035 mm. wide, 0.015 mm. long, emarginate apically. Lingula finger-like, 0.035 mm. long, 0.009 mm. wide. Clasper (Fig. 15*c*) 0.12 mm. long, acutely pointed, rounded mesally at mid-length. Penis (Fig. 15*d*) in lateral view roundly angled at mid-length, subparallel sided, apically abruptly truncate and with slightly hooked tooth.

HOLOTYPE: Pupal case on slide mount deposited in Maskell collection.

TYPE LOCALITY: Pelorus Bridge. Collect. L. J. D. 20/10/51.

FOOD PLANT: *Pittosporum eugenioides*.

Closely related to *Asterochiton simplex* Maskell from the same food plant.

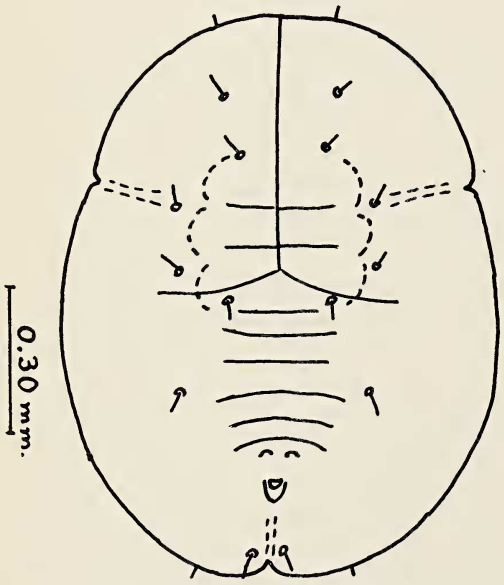


FIG. 13. *Asterochiton pittospori* n. sp. Pupal case, dorsal.

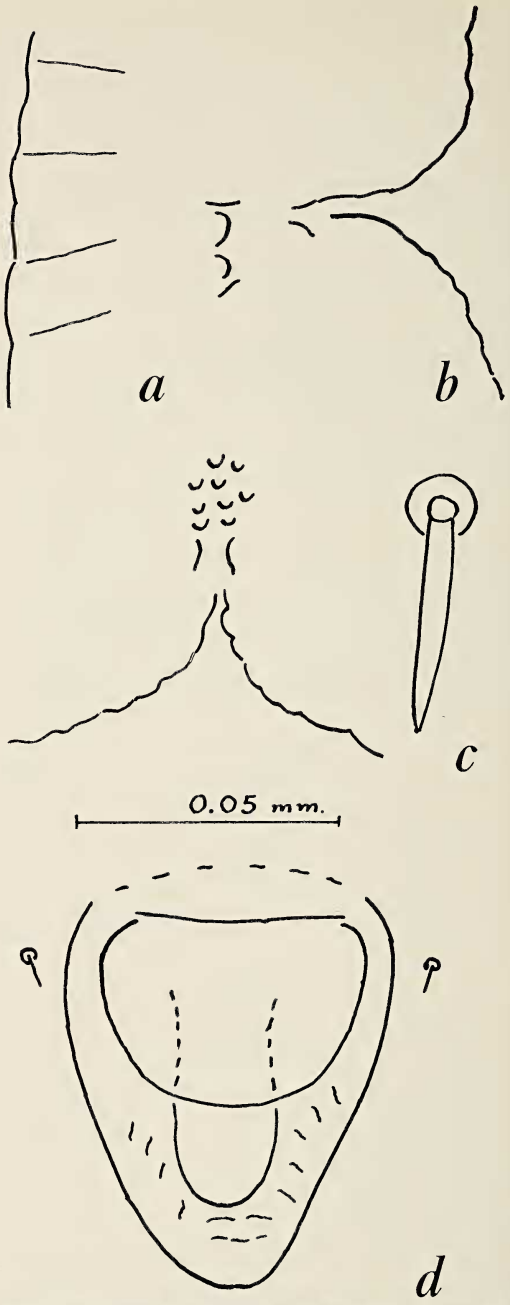


FIG. 14. *Asterochiton pittospori* n. sp. Pupal case: *a*, Margin; *b*, thoracic tracheal pore; *c*, abdominal tracheal pore; *d*, vasiform orifice.

Asterochiton simplex (Maskell)
Figs. 16–18

Asterochiton lecanioides Mask. (in part) 1879: 215–6.

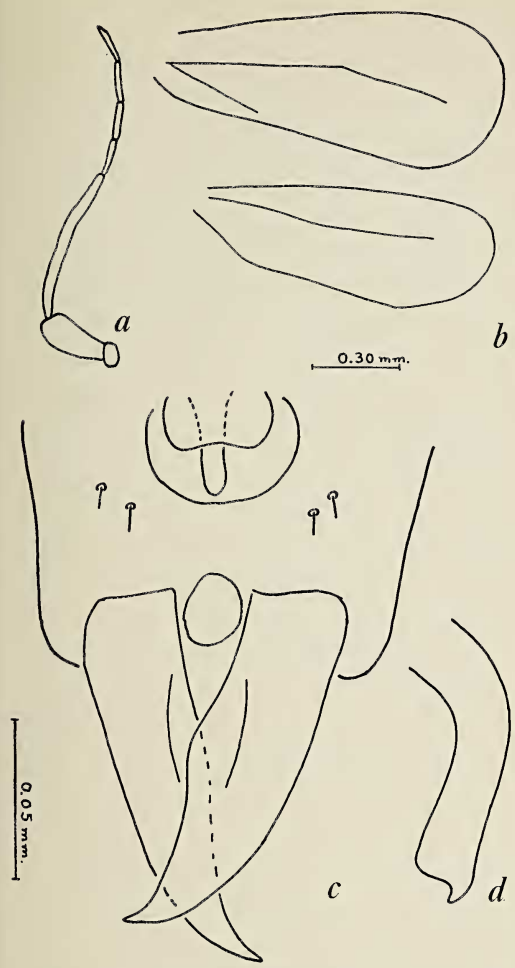


FIG. 15. *Asterochiton pittospori* n. sp. Adult female: *a*, Antenna; *b*, wings. Adult male: *c*, Vasiform orifice and claspers; *d*, penis, lateral view.

Aleurodes simplex Mask., 1890: 175–6, pl. 13, fig. 27; 1896: 441–2.
Aleyrodes simplex Mask. Cockerell, 1902: 281; Kirkaldy, 1907: 69; Quaintance, 1908: 7.
Dialeurodoides simplex (Mask.) Quaintance and Baker, 1914: 99.
Asterochiton simplex (Mask.) Quaintance and Baker, 1915: xi.

LARVA: Unknown.

PUPAL CASE: (Fig. 16). Length 1.2 mm., width 0.90 mm. Colour white. Shape elliptical, flat. With a narrow fringe of white wax. Margin (Fig. 17*a*) regularly crenulate, about 12 crenulations per 0.10 mm. Thoracic tracheal folds present but faint. Tracheal pore (Fig. 17*b*) invaginated with three or four irregular teeth at bottom. Abdominal tracheal fold, pore and comb (Fig. 17*c*) similar to thoracic. Submarginal area not differentiated. Posterior marginal setae present. Four pairs of setae on cephalothorax. One pair of setae on each of first, fourth, fifth, sixth and seventh abdominal segments. A pair of minute setae on 8th. Caudal setae same size as other abdominal setae. Vasiform orifice (Fig. 17*d*) subtriangular, 0.021 mm. long, 0.019 mm. wide, floor reticulate. Operculum subtriangular 0.015 mm. wide, 0.009 mm. long, not filling half orifice. Lingula finger-like, rounded apically, slightly constricted basally. Caudal furrow absent.

ADULT: *Female*, antennae (Fig. 18*a*) segment 1, 0.02 mm. long; 2, 0.06 mm.; 3, 0.165 mm.; 4, 0.03 mm.; remainder missing. Wings,

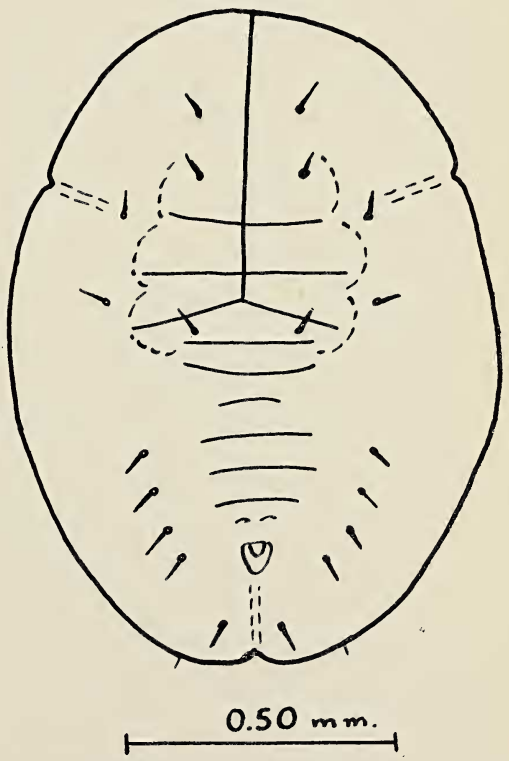


FIG. 16. *Asterochiton simplex* Mask. Pupal case, dorsal.

white, immaculate, forewing (Fig. 18*b*) 1.3 mm. long, R_1 absent. *Male*, vasiform orifice (Fig. 18*c*) subcircular. Operculum transverse, 0.04 mm. wide, 0.02 mm. long, emarginate apically. Lingula 0.03 mm. long, 0.01 mm. wide, finger-like, rounded apically, slightly constricted basally. Clasper (Fig. 18*d*) 0.155 mm. long, acutely pointed and with a slightly rounded hump at mid-length mesally. Penis (Fig. 18*e*) as in figure. Not abruptly truncate but tapering more gradually to base of tooth.

LECTOTYPE: Pupal case on slide mount in Maskell collection.

TYPE LOCALITY: Christchurch.

FOOD PLANTS: *Pittosporum eugenioides*, *Coprosma lucida* and several other trees.

MATERIAL: Two pupal cases (Maskell material) on leaf in U. S. Bureau of Entomology. Pupal material labelled *lecanioides* in Canterbury Museum. Unmounted duplicate material in Maskell collection.

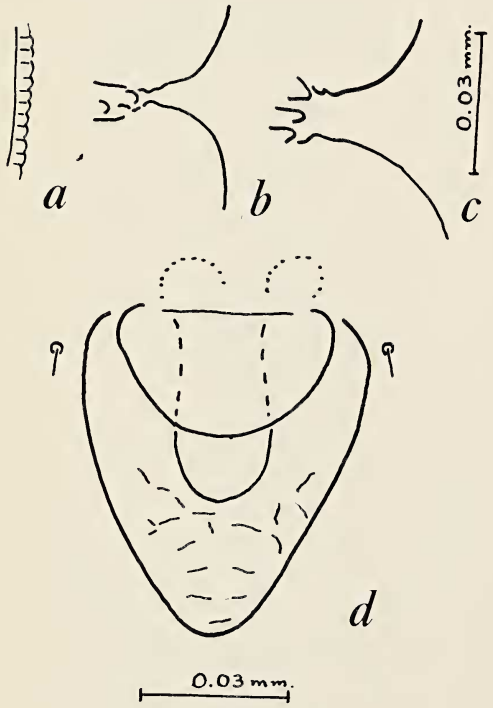


FIG. 17. *Asterochiton simplex* Mask. Pupal case: *a*, Margin; *b*, thoracic tracheal pore; *c*, abdominal tracheal pore; *d*, vasiform orifice.

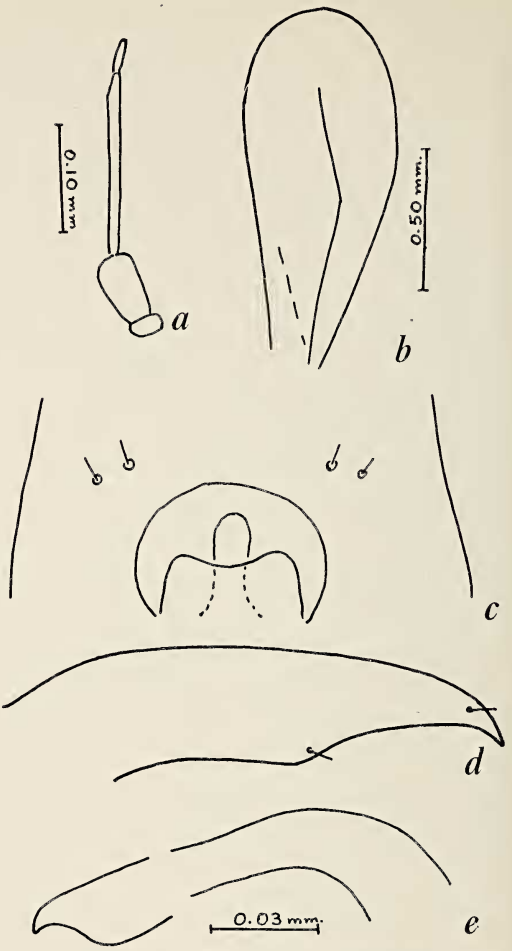


FIG. 18. *Asterochiton simplex* Mask. Adult female: *a*, Antenna; *b*, forewing. Adult male: *c*, Vasiform orifice; *d*, clasper; *e*, penis, lateral view.

Genus ALEYRODES Latreille

KEY TO PUPAL CASES OF NEW ZEALAND SPECIES OF *Aleyrodes*

Subcircular; 14 minute submarginal setae on each side; medial pigmentation light brown ..... **fodiens** Maskell

Broadly elliptical; 11 submarginal setae on each side; no pigmentation ..... **winterae** Takahashi

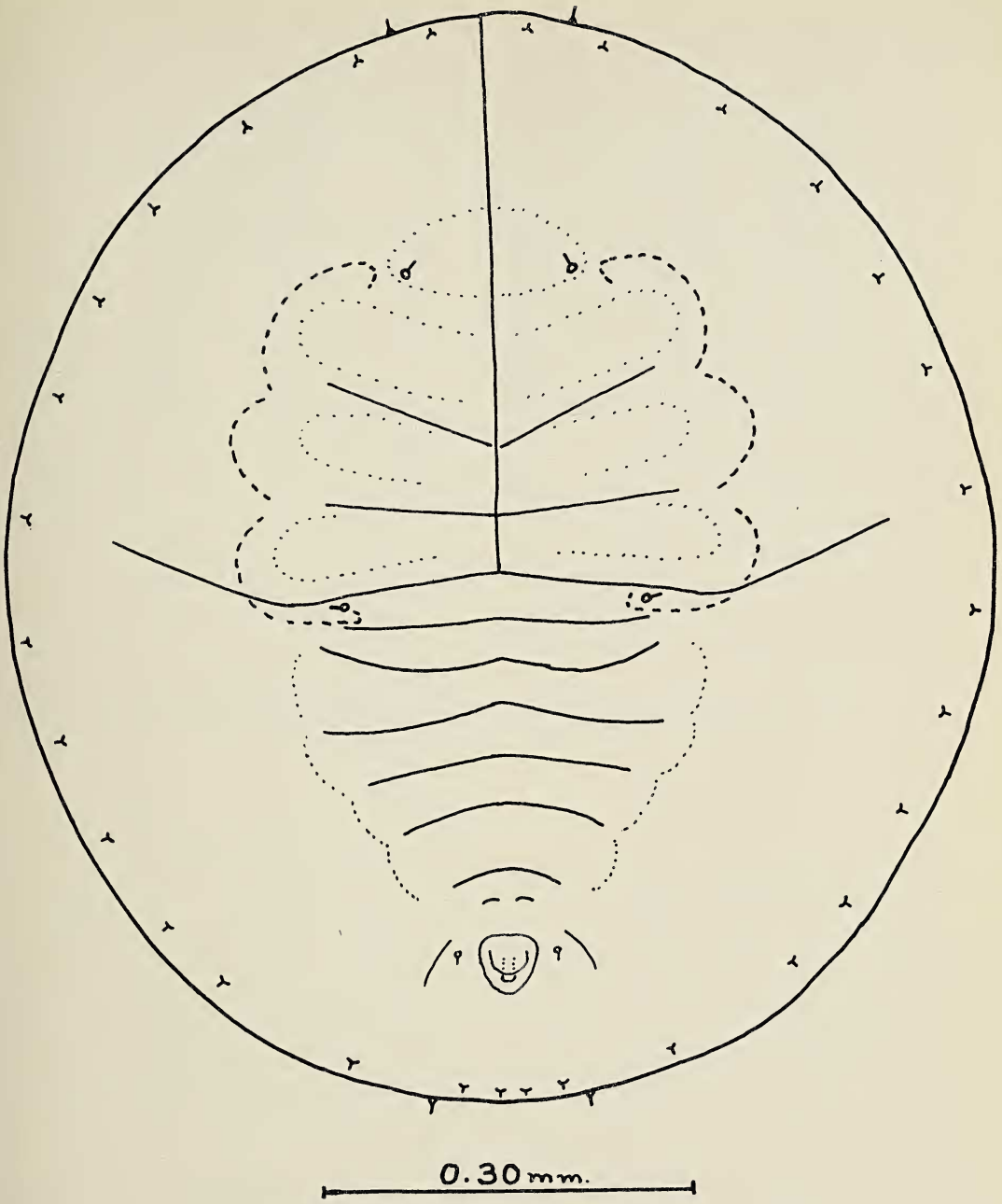


FIG. 19. *Aleyrodes fodiens* Mask. Pupal case, dorsal.

Aleyrodes fodiens (Maskell)
Figs. 19–21

Aleurodes fodiens Mask. 1896: 433–4, pl. 30, fig. 2; (Mask.) Cockerell, 1902: 281.

Aleyrodes fodiens (Mask.) Kirkaldy, 1907: 54; (Mask.) Quaintance 1908: 6.

Dialeurodes fodiens (Mask.) Quaintance and Baker, 1914: 97; Quaintance and Baker, 1917: 407, 415–416, pl. 66, figs. 1–4.

LARVA: Described by Maskell (1896) in

general terms. Slide missing.

PUPAL CASE: (Fig. 19). Length 0.87 mm., width 0.80 mm. Colour light brown in central disc and halfway to margins. Shape subcircular, flat. Margin obscurely and irregularly dentate, about 20 teeth in 0.10 mm. Thoracic and abdominal tracheal folds, pores and combs absent. Anterior and posterior marginal setae present. Fourteen minute submarginal setae on each half just mesad of margin. Submargin not delimited. One pair of minute setae on cephalic area, and on first and eighth abdominal segments. Caudal setae twice as long as marginal setae. Sutures and segmentation as in figure. Vasiform orifice (Fig. 20*a*) 0.062 mm. long, 0.05 mm. wide, subcordate, floor strongly reticulate, almost appearing to be toothed on posterior margin. Operculum 0.03 mm. long, 0.04 mm. wide, sub-semicircular, half filling orifice. Lingula little constricted, subparallel sided, rounded apically.

ADULT: *Female*, antenna (Fig. 20*b*); segment 3, 0.18 mm.; 4, 0.045 mm.; 5, 0.05 mm.; 6, 0.04 mm.; 7, 0.035 mm. Wings (Fig. 20*c*) white, unspotted, forewing 1.3 mm. long, stub of R_1 present. *Male*, operculum (Fig. 21*a*) length 0.02 mm., width apically 0.02 mm. wider basally, emarginate apically. Lingula rounded apically. Clasper (Fig. 21*a*) 0.15 mm. long, apex acute, prominent almost angulate bulge bearing two setae at mid-length mesally, four or five setae apically. Penis (Fig. 21*b*) subparallel sided in lateral view, abruptly angled to base of tooth which is fairly long and acute.

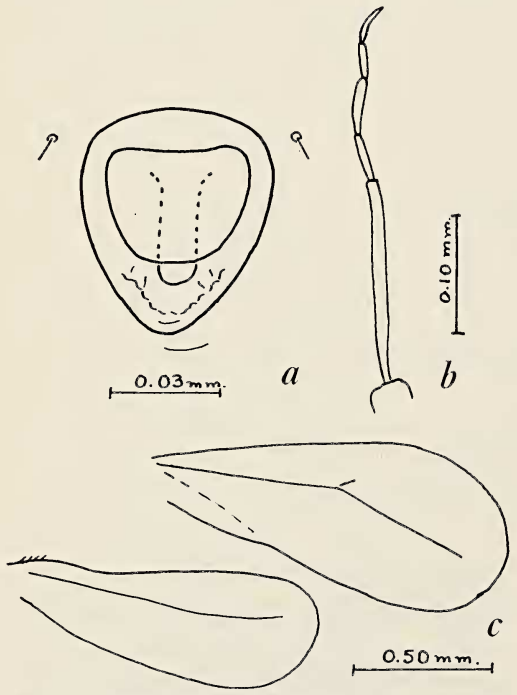


FIG. 20. *Aleyrodes fodiens* Mask. Pupal case: *a*, Vasiform orifice. Adult female: *b*, Antenna; *c*, wings.

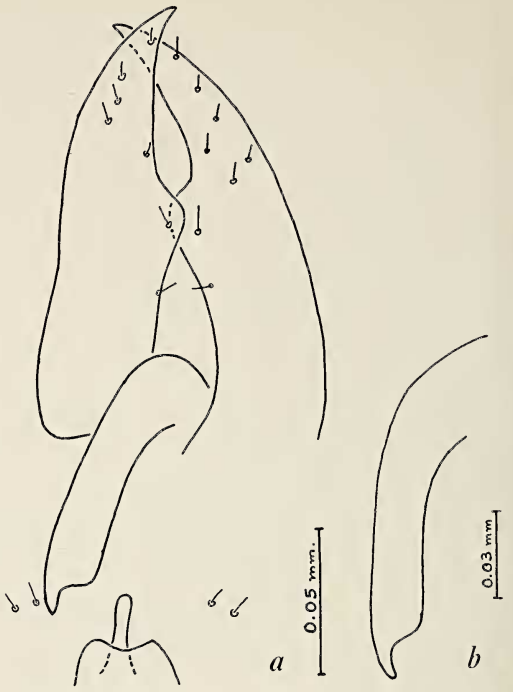


FIG. 21. *Aleyrodes fodiens* Mask. Adult male: *a*, Vasiform orifice, claspers, and penis; *b*, penis, lateral view.

LECTOTYPE: Pupal case on slide mount in Maskell collection.

TYPE LOCALITY: Reefton. Collect. R. Raithby.

FOOD PLANT: *Drimys* (*Wintera*) *axillaris*.

MATERIAL: Unmounted duplicate material in Maskell collection. Pupal cases and adults from *Wintera* at Waiho. Collect. L.J.D. 20/11/50.

Quaintance and Baker (1917) remark that *fodiens* is not a typical *Dialeurodes*. Although it is subcircular rather than oval and the lingula is not noticeably knobbed it would appear to fit the genus *Aleyrodes* best and I have returned it to that genus.

Aleyrodes winterae Takahashi

Figs. 22, 23

Aleyrodes winterae Takahashi 1937: 251–253.

LARVA: Unknown.

PUPAL CASE: (Fig. 22). Length 0.85–0.97 mm., width 0.72–0.81 mm. Colour light yellowish-brown. Shape subcircular, flat but slightly raised, sides not vertical. Margin (Fig. 23*a*) obscurely and irregularly crenulate. No thoracic or abdominal tracheal folds, pores or combs. Submargin indicated by a faint line anteriorly. Posterior marginal setae present. One pair of minute paramedian setae in cephalic region and one pair on each of the first and eighth abdominal segments. Ten submarginal setae on each side, six on the cephalothorax and four on the abdomen. Caudal setae not differentiated from submarginal setae. There are paired paramedian wrinkled areas on the anterior borders of abdominal segments 2–6 inclusive and also on the meso- and meta-thorax. Faint paired paramedian pores on abdominal segments 1–7. Vasiform orifice (Fig. 23*b*) 0.07 mm. long, 0.05 mm. wide, subtriangular, floor reticulate. Operculum 0.03 mm. long, 0.035 mm. wide, half filling orifice. Lingula finger-like, bluntly pointed, little constricted basally.

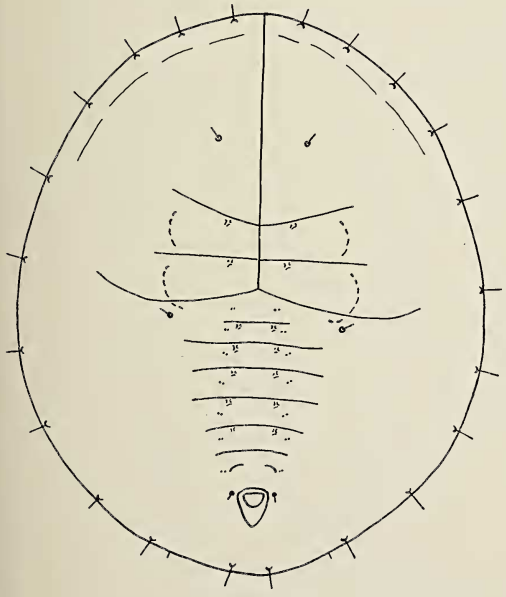


FIG. 22. *Aleyrodes winterae* Takahashi. Pupal case, dorsal.

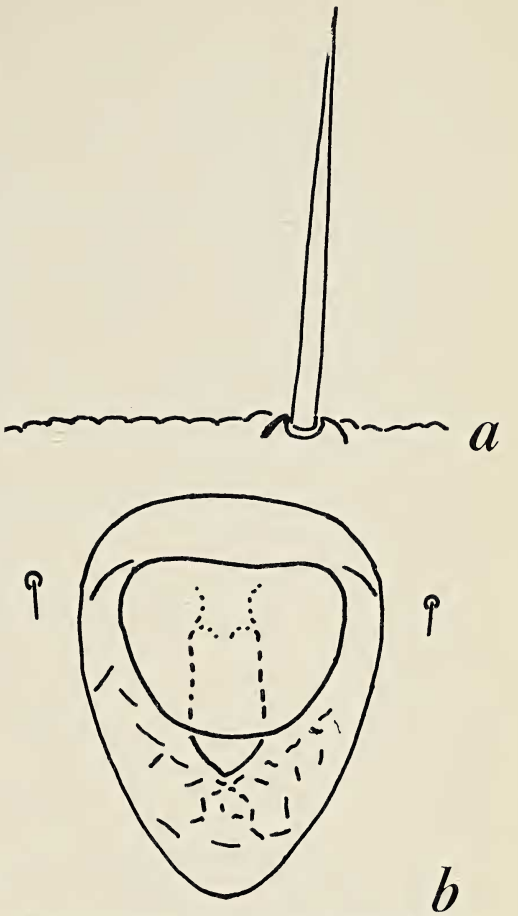


FIG. 23. *Aleyrodes winterae* Takahashi. Pupal case: *a*, Margin and seta; *b*, vasiform orifice.

ADULT: Unknown.

COTYPES: In the Department of Agriculture Research Institute, Formosa, and in the British Museum.

TYPE LOCALITY: Palmerston North. Collect. W. Cottier.

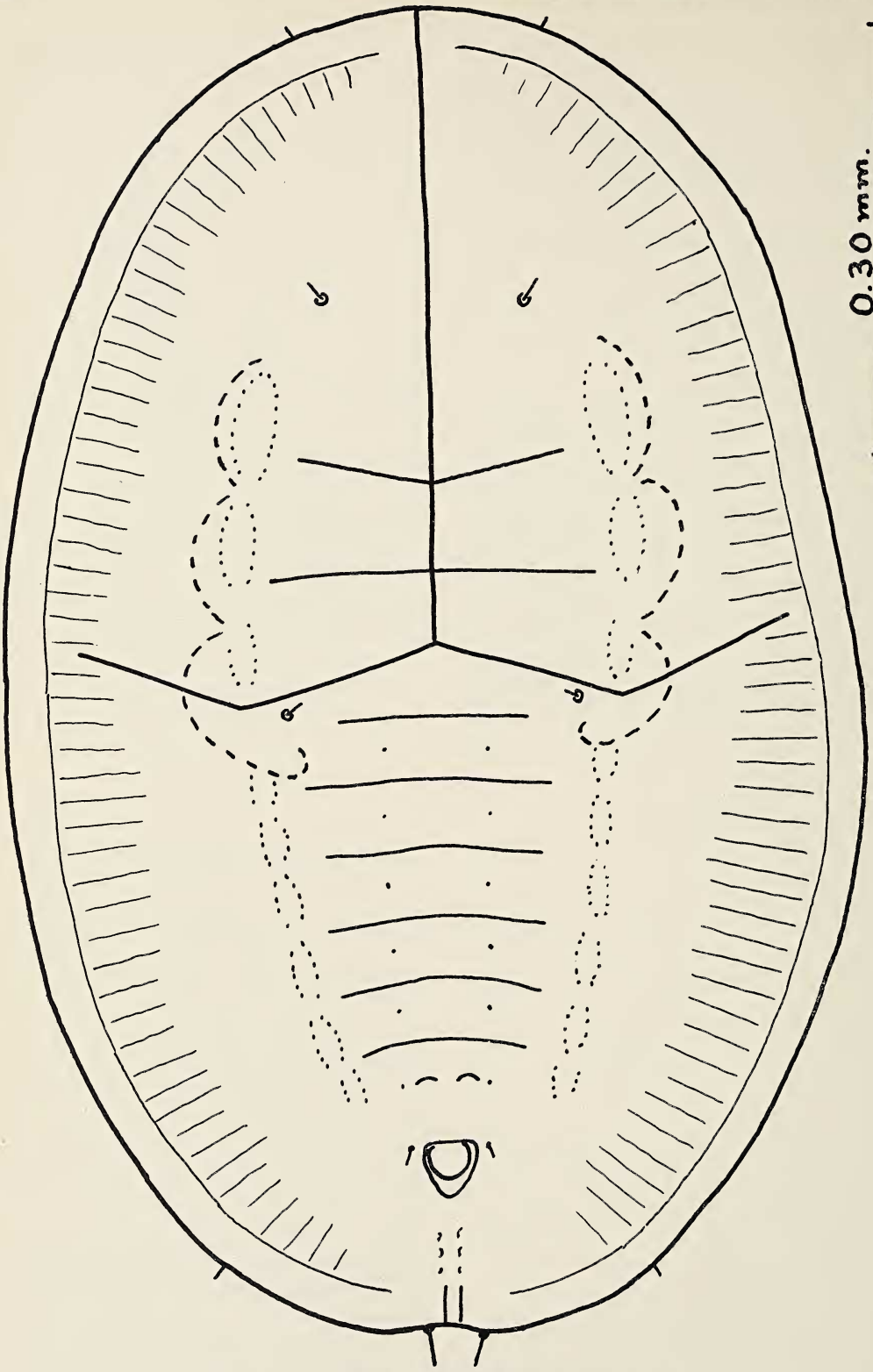


FIG. 24. *Aleuroclava eucalypti* n. sp. Pupal case. dorsal.

FOOD PLANT: *Wintera colorata.*

MATERIAL: Several specimens found in association with *fodiens* on *Wintera axillaris* in Maskell unmounted duplicate material collected by R. Raithby in Reefton.

This species is not a typical *Aleyrodes* according to Takahashi. It is evidently closely related to *fodiens*. The pupal cases are thicker and more raised than those of *fodiens*. Both species make shallow pits on the leaf.

Genus ALEUROCLAVA Singh

Aleuroclava eucalypti n. sp.

Figs. 24–26

LARVA: Unknown.

PUPAL CASE: (Fig. 24). Length 0.90 mm.–1.12 mm., width 0.56–0.71 mm. Colour white or colourless. Shape elliptical, flat. Margin (Fig. 25*a*) crenulated, 20–26 crenulations in 0.1 mm. Thoracic and abdominal tracheal folds, pores and combs absent. Submargin defined by submarginal line. Mesad of the submarginal line are faint radial depressed lines with between them radial rows of 7 or 8 tubercles of which the one nearest the margin is often larger. Segmentation as in figure. Thoracic area and abdominal segments 2–6 bounded laterally by a tubercular line. A pair of paramedian pores on each of abdominal segments 2–7. One pair of cephalic setae, one pair first abdominal, one pair 8th abdominal and one pair caudal 0.035 mm. long. Vasiform orifice (Fig. 25*b*) length 0.039 mm., width 0.036 mm. subcircular, raised above abdomen, toothed posteriorly and reticulate on floor. Operculum length 0.023 mm., width 0.028 mm., slightly subtrapezoidal, subtruncate apically. Lingula parallel sided, rounded apically, barely projecting beyond operculum, 0.02 mm. long. Anal furrow short, not extending halfway to orifice.

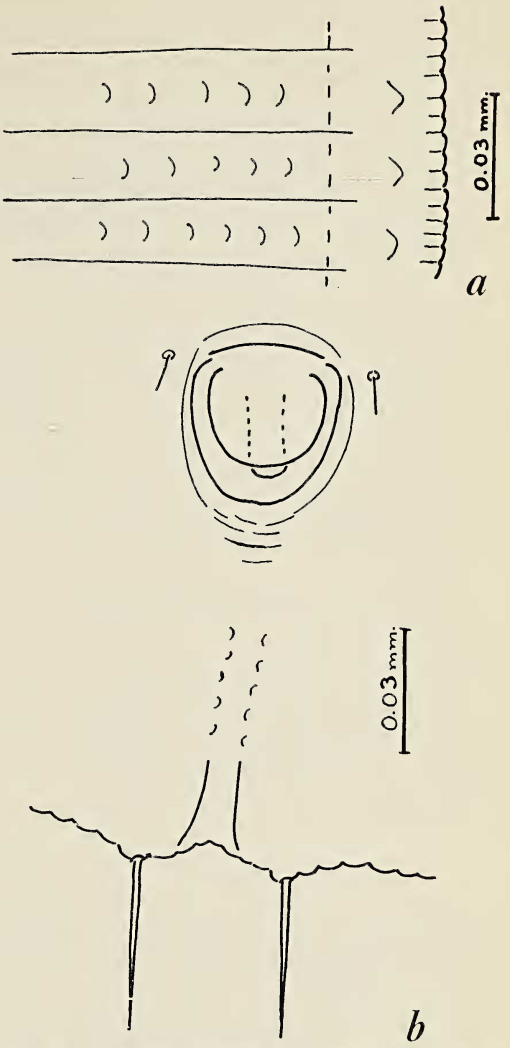


FIG. 25. *Aleuroclava eucalypti* n. sp. Pupal case: *a*, Margin; *b*, vasiform orifice and caudal margin and fold.

ADULT: *Female*, antennae: segment 2, 0.06 mm. long; 3, 0.14 mm.; 4, 0.04 mm.; 5, 0.045 mm.; 6, 0.035; 7, 0.045 base longer than flagellum. Wings white, immaculate, forewing 1.3 mm. long, R_1 present in some mounts, Rs present, Cu indistinct. Hind tibiae with comb of 16 setae. *Male*, operculum (Fig. 26*a*) 0.03 mm. wide, 0.015 mm. long. Lingula strap-shaped 0.025 mm. long, 0.005 mm. wide, projecting beyond orifice, subtruncate apically with corners angularly excised. Penis (Fig. 26*b*) length 0.11 mm., in lateral view, parallel sided, sinuate, truncate apically.

HOLOTYPE: Pupal case on slide mount deposited with Maskell collection.

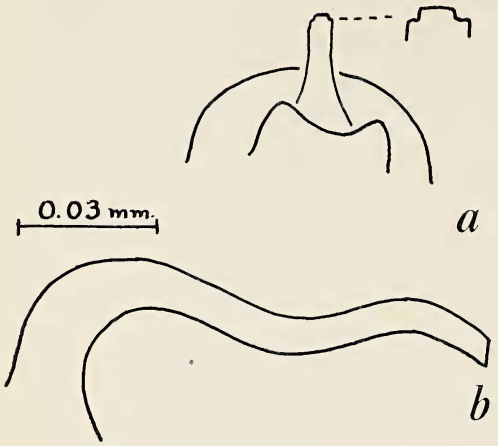


FIG. 26. *Aleuroclava eucalypti* n. sp. Adult male: *a*, Vasiform orifice; *b*, penis, lateral view.

TYPE LOCALITY: Waikakaho, Blenheim. Collect. L.J.D. 3/11/50.

FOOD PLANT: *Eucalyptus globulus*.

This species was almost certainly introduced into New Zealand with the food plant and therefore is of Australian origin.

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